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GOVERNMENT OF THE
GOLD COAST.

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MEDICAL AND SANITARY REPORT
FOR THE YEAR 1907.

PUBLISHED BY
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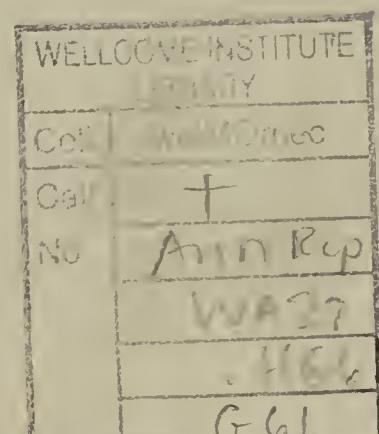


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CONTENTS.

	PAGE
1. Departmental.—European Staff, Native Staff	5
2. Financial	5
3. Population	6
4. Health of Europeans	7
5. General Sanitary Condition of the Colony, Ashanti and the Northern Territories	9
6. Anti-Malaria Precautions	10
7. Instruction in Hygiene and Sanitation	10
8. Scientific Research	10
9. Hospitals and Dispensaries	11
10. Lunatic Asylum	12
11. Gaols	13
12. Diseases of Special Interest	13
13. Meteorological.	14

Annual Report

ON THE

MEDICAL DEPARTMENT

FOR THE YEAR ENDING 31st DECEMBER, 1907.

I have the honour to submit the following Report on the Medical Department for 1907 :—

DEPARTMENTAL.

MEDICAL OFFICERS.—There were 38 Medical Officers present on duty during the year, and 25 were on leave in England. Two new appointments were made to fill vacancies, and three to provide for newly opened stations in the Northern Territories. The total strength is 44 as against 41 in 1906.

European Staff.

NURSING SISTERS.—The total strength of the European Nursing Staff is five, as in 1906. Two of the Nursing Sisters resigned during the year and two new appointments were made.

The Native Staff consists of one Chief and one Assistant Clerk, and three Native Staff. junior Clerks, a Storekeeper and Assistant Storekeeper, 18 Dispensers of different classes, 16 Dispenser Pupils, 42 Dressers of varying classes ; and, connected with the Lunatic Asylum at Accra, a Chief and an Assistant Warden, four Keepers, a Matron and a Gatekeeper. Seventeen Inspectors of Nuisances were employed in connection with sanitation.

I took over my appointment on 17th August, and on the 13th November I proceeded on a tour of inspection, my main object being to acquire a knowledge of the conditions existing in the Northern Territories ; and during my progress I inspected, up to the end of the year, Sekondi, Tarkwa, Abosso mining village, Obuassi, Kuniasi, Kintampo, Bole and Wa. I submitted reports and made recommendations as to general and sanitary improvements which have already been given effect to or are under favourable consideration.

It was found that many of the Medical Officers, especially those recently appointed, were unacquainted with official methods of procedure, principally those concerning the submitting of Returns and Reports, and sometimes even the nature of the duties they were expected to perform, their only source of information in these matters being the Native subordinate officer of the station. The only Departmental Rules and Regulations in existence were compiled in 1891 by Dr. J. D. McCarthy ; they had been considered obsolete some years ago and were no longer used. As they had been exceptionally well prepared it was considered advisable to revise them and bring them into line with recent requirements. They will be printed in book form, interleaved to allow of further amendment when necessary, and distributed to the members of the Department.

FINANCIAL.

The revenue derived from Hospital fees and the occasional sale of medical comforts and recovery of cost of drugs and dressings used by Medical Officers in private practice was £978. 17s. 4d. and the expenditure was £32,164. 17s. 8d.

It is proposed to increase the Sanitary vote in 1908 by £900, to be allocated in sums of £300 each to Accra, Cape Coast and Sekondi for the clearing of Government lands.

POPULATION.

Accurate statistics are not available. The last census was taken in 1901 and the returns showed the total population of the Colony, Ashanti and the Northern Territories as 1,338,433, but the figures are regarded as approximate.

There is no registration of births or deaths, therefore native vital statistics are scientifically valueless. At some of the larger coast towns records are kept of the number of permits issued for burials in public cemeteries, but these records do not give reliable information as to the number of deaths which occur, and they provide no information whatever as to their cause ; the latter is obtained from the hospital records which only show a fraction of the actual death rate. For example, the total number of deaths from all causes in the Colony, Ashanti and the Northern Territories is shown by the hospital records of last year to have been 113, whereas, in Accra alone 928 burial permits were given by the Colonial Chaplain.

The following comparative table will serve as an instructive illustration :—

NATIVE MORTALITY AS SHOWN BY—

		Hospital Records for Gold Coast, Ashanti and Northern Territories.	Burial Permit Records for Accra, Ada, Cape Coast, Elmina, Sekondi and Saltpond.
1902	... ... ...	156	1,781
1903	... ... ...	164	1,718
1904	... ... ...	135	1,405
1905	... ... ...	168	1,712
1906	... ... ...	126	1,361
1907	... ... ...	113	1,517
Total ...		862	9,494

The five towns mentioned are those only where burial permits are given, and as they form a very small section of the whole country, it is easily apparent that the death rate, even approximately, must be much greater than might be inferred from a study of the hospital records of previous years.

A complete registration scheme can hardly be made applicable except to the more important towns ; but in the absence of the all-important information which would be derived therefrom, it will not be possible to estimate the extent of any general or special mortality, an accurate knowledge of which would direct endeavour to combat and suppress disease. Such a result can only be arrived at by compulsory registration of the cause of death ; and in the present state of civilization of the natives generally, this would not, as a rule, be possible except in the situations I have indicated above. Elsewhere, for the present, at least, the most that can be hoped for is a simple record of numbers. Registration of births is also important and should not present many difficulties. The whole question is occupying the attention of the Colonial Government, and it is probable that in the near future, measures, as fully comprehensive as are possible in the existing circumstances, will be adopted. The work involved should form part of the duties of the various Medical Officers of Health.

HEALTH OF EUROPEANS.

Compared with preceding years the following table shows an improvement. There is a decrease in the death and invaliding rates.

EUROPEANS.

STATISTICS OF MORTALITY AND INVALIDING.

How employed.	Number.	Deaths.	Invalided.	Death rate per 1,000.	Invaliding rate per 1,000.
Officials	370	3	20	8·10	54·05
Merchants	538	9	29	16·72	53·90
Mining Companies ...	883	12	46	13·59	52·09
Missions	86	1	—	11·62	—
Totals ...	1,877	25	95	13·31	50·61

Station.	Number.	Deaths.	Invalided.	Death rate per 1,000.	Invaliding rate per 1,000.
Colony	1,595	22	82	13·79	51·41
Ashanti	259	2	11	7·72	42·47
Northern Territories ...	23	1	2	43·47	86·95
Totals ...	1,877	25	95	13·31	50·61

CAUSES OF DEATH AMONGST OFFICIALS.

Blackwater Fever	...	...	...	...	2
Suicide	...	...	...	...	1
					—
					3

CAUSES OF INVALIDING AMONGST OFFICIALS.

Blackwater Fever	...	...	...	...	8
Malaria	...	...	...	...	6
Enteric ...	...	...	...	...	1
Abscess	...	...	...	...	1
Hepatic Congestion	...	...	...	...	1
,, Cirrhosis	...	...	...	...	1
Phthisis...	...	...	...	...	1
Gout	...	...	...	...	1
					—
					20

CAUSES OF DEATH AMONGST NON-OFFICIALS.

Blackwater	...	...	...	...	7
Malaria	...	...	...	...	6
Accidents	...	...	...	...	3
Phthisis...	...	...	...	...	1
Pneumonia	...	...	...	...	1
Brain, Acute softening of	...	...	...	...	1
Cyanide Poisoning	...	...	...	...	1
Alcoholism	...	...	...	...	1
Enteric	...	...	...	...	1
					—
					22

CAUSES OF INVALIDING AMONGST NON-OFFICIALS.

Blackwater	...	...	...	...	...	24
Malaria	...	...	...	...	...	19
Sciatica	...	...	...	...	...	2
Heart Disease—Valvular	...	...	...	...	...	2
Dysentery	...	...	...	...	...	1
Pleurisy	...	...	...	...	...	1
Alcoholism	...	...	...	...	...	1
Gonorrhœal Cystitis	...	...	...	...	...	2
Phthisis	...	...	...	...	...	2
Acute Gastritis	...	...	...	...	...	1
Liver Abscess and Congestion	...	...	...	...	...	2
Diarrhœa	...	...	...	...	...	1
Varicocele	...	...	...	...	...	1
Liver Cancer	...	...	...	...	...	1
Nervous Disease	...	...	...	...	...	3
Liver Atrophy	...	...	...	...	...	1
Accidents	...	...	...	...	...	2
Rheumatic Fever	...	...	...	...	...	1
Appendicitis	...	...	...	...	...	1
Inflamed Glands and Boils	...	...	...	...	...	1
Mental	...	...	...	...	...	1
Sunstroke	...	...	...	...	...	1
Peritonitis	...	...	...	...	...	1
Gastritis	...	...	...	...	...	1
Perineal Fistula	...	...	...	...	...	1
Chronic Constipation	...	...	...	...	...	1
						75

COMPARATIVE TABLE OF CAUSES OF DEATH AND INVALIDING.

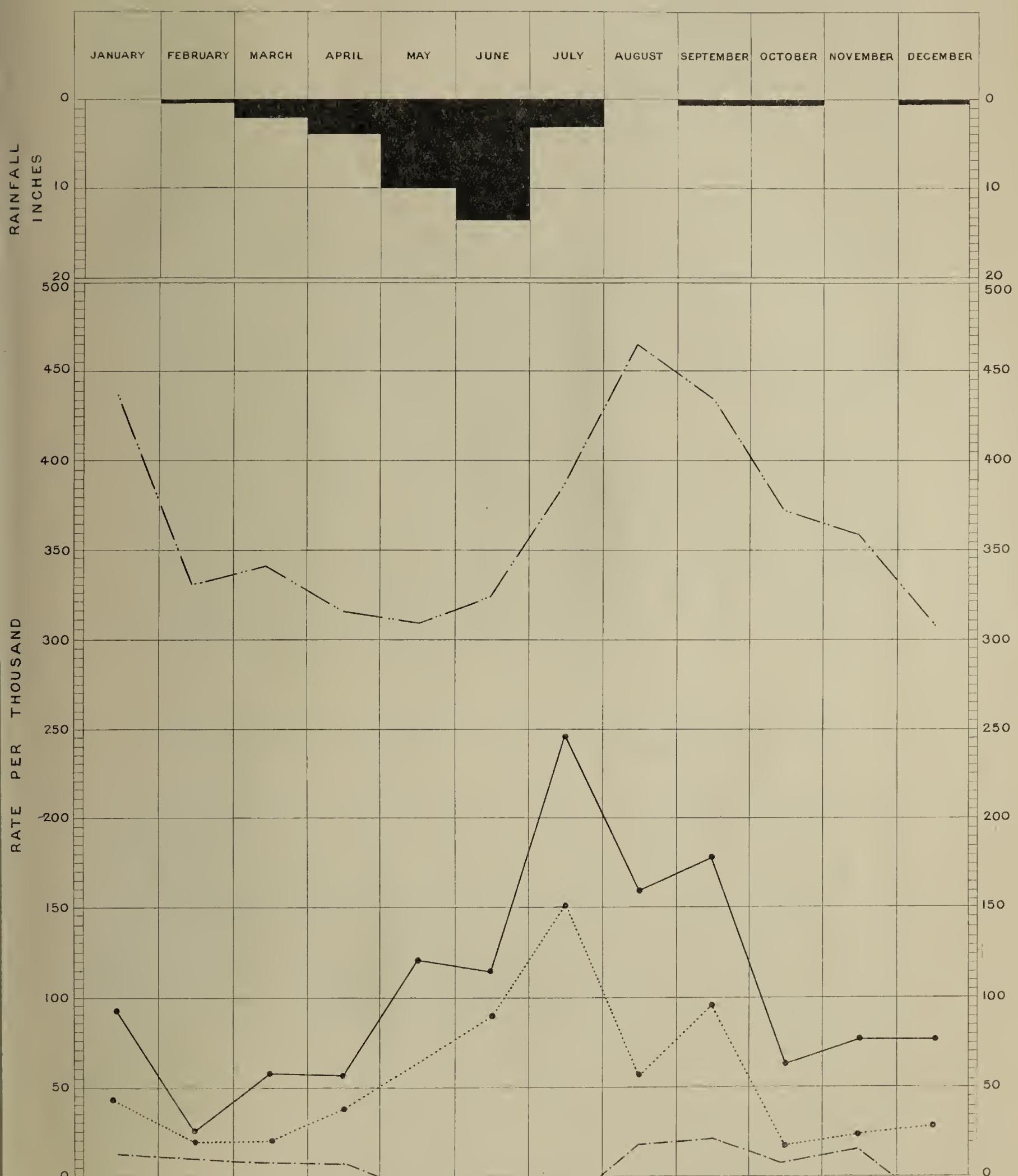
	DEATHS.			INVALIDING.		
	Climatic.	Non-Climatic.	Accidents.	Climatic.	Non-Climatic.	Accident.
	Officials	...	...	14	14	6
Non-Officials	14	6	25	1
Total	...	16	6	3	63	31

OFFICIAL ENTRIES ON SICK LIST.

	Total Entries on Sick List.	Climatic.	Non-Climatic.	Injuries.
	508	353	139	16

The above figures indicate improvement in so far as mortality and invaliding rates are concerned, especially amongst officials, and would appear also to indicate improvement in general health. In this connection I am not in a position to effect a comparison with previous years, but I have endeavoured by means of the accompanying chart to give an idea of the sickness rate of

—CHART SHEWING THE RATES PER THOUSAND
OF SICK PER MONTH DURING 1907 AT ACCRA.—



- (a) Sick medically treated but not included in sick list returns.
- (b) Sick included in sick list returns.
- (c) Total malaria included in (a) and (b).
- (d) Invaliding rate.

Accra, which is considered to be the healthiest station in the Colony. It will be necessary to explain that the custom has been that only cases of serious nature are admitted to hospital, ordinary cases being treated in quarters, and that the majority of these escape being included in the official returns. I have with some considerable expenditure of time and trouble contrived to obtain the latter from the Dispensary records, and the monthly rates per 1,000 appear in chain and double dotted line on the chart. The rates of officially recorded sick are shown in dotted line, and the sum of these two represents the sickness rate of Accra. The sickness rate of a locality is the most reliable indication of its healthiness or the reverse, and it will be admitted that the sickness rate of Accra is very high. The total malaria rate shown by a continuous line bears a marked relation to the sickness rate and also to the rainfall, the highest manifestation of the disease coinciding with the periods during which mosquitoes would be most plentiful. There was very little rain in Accra in 1906 for the five months preceding December, but in December there was a total rainfall of 3·24 inches. This may account for the high rates in January, 1907. The invalidings (chain and dotted line) will be seen to have coincided with, or to have followed the periods of highest sick rate.

No record of non-official illness is kept excepting those who are treated in hospital, so that no really reliable data from which a sickness rate can be ascertained are provided. Measures are being adopted to ensure the future provision of this most important information.

I consider that most, if not all cases of illness should be treated in hospital. It is not easy to gauge the severity of an attack, say, of fever, unless the patient is under close observation and his temperature frequently observed, and it sometimes happens that such an one may be, and often is, allowed to return to duty too soon, with the result that he again comes under treatment in a few days. It is proved in practice that both the duration and severity of an attack of fever are limited by a proper hospital régime. There is also the not unimportant consideration that a malarial fever patient at large is a potential source of infection to those living with or near him.

GENERAL SANITARY CONDITION OF THE COLONY, ASHANTI AND THE NORTHERN TERRITORIES.

In so far as the larger towns of the Colony are concerned, the recent work of sanitation seems mainly to have been directed towards the amelioration of existing conditions which were allowed to obtain in the earlier history of the country : and, judging from previous reports, improvements have been effected.

Judging by what I have seen at the out-stations I have visited, and from the reports received of others, certain improvements are also being slowly effected here and there throughout the Colony and its Dependencies. Speaking generally, there is no lack of sympathetic consideration of recommendations made by Medical Officers for sanitary improvements, but the limitations appear to consist of want of labour and time for proper supervision of such labour as is obtainable. Most of the Medical Officers at out-stations are obliged to devote much of their time, in some instances as much as five or six hours of their working day, to the performance of such duties as those entailed by Court and Treasury work and the collection of Caravan taxes, in addition to the medical routine work of the station, it is therefore only in the cases of specially energetic and zealous Officers and those who keep exceptionally fit, physically, that much sanitary work is done. I am confident that the importance of a much-needed reform which will place Medical Officers on a footing less inimical to their usefulness as members of a Medical and Sanitary Department will be recognized.

At Accra, Sekondi and Cape Coast, sanitation is controlled by Town Councils who appoint a Medical Officer of Health as their sanitary adviser, and in Ashanti, the Sanitary vote is controlled by the Chief Commissioner. The

Medical Officer of Health or other Medical Officer, as the case may be, makes his immediate representations as to sanitary requirements to these authorities when it is within their scope to sanction the needful expenditure.

The Principal Medical Officer controls a vote of £4,239, which is apportioned as follows :—Colony £3,637 ; Ashanti £340 ; Northern Territories £262. This is used in the payment of Inspectors of Nuisances, labourers and scavengers, the upkeep of latrines, dust-bins, &c.

It was my intention to submit a scheme for better sanitary supervision beginning with the coast towns, but I found on my return from the Northern Territories in March that measures of a much more complete and effective nature than those I was prepared to recommend, tentatively, would be likely to result as the outcome of Professor Simpson's visit to the Gold Coast.

ANTI-MALARIA PRECAUTIONS.

Energetic measures have been taken to locate and deal with the breeding places of mosquitoes, by destroying them when possible and treating them with kerosine. A large number of holes have been filled in Accra. Endeavours have been made to impress on the natives the importance of destroying mosquito larvæ and limiting breeding possibilities by keeping their premises free from the numerous unconsidered objects, tin pans, &c., which might contain rain-water.

INSTRUCTION IN HYGIENE AND SANITATION.

Two years ago a scheme was inaugurated for the teaching of Elementary Hygiene and of Sanitation in the Government-assisted schools, and the subject was made a compulsory one at the Teachers' examinations. Their knowledge of the subject was mainly derived from the study of literature and was not considered extensive enough to enable them, with any reasonable hope of success, to transmit it to their pupils. In consultation with the Director of Education it was decided to attempt a better organized and more systematic course of training, and arrangements were made that at stations where a reasonable number of teachers would attend them, regular courses of lectures would be given by Medical Officers. It was decided, for the purpose of uniformity in these courses of instruction, that Dr. Prout's book should be adopted as the standard, for a time at least, and that the various Medical Officers should lecture from it, or make it the basis of their lectures, and that for examination purposes the papers should be set at Accra by a Board of Medical Officers when necessary—the questions being taken from the subject matter contained in the standard book. Failure to show the required proficiency would disqualify a teacher for the rest of his examination. Voluntary attendance of others at these lectures will be encouraged and certificates of proficiency will be obtainable by them. In addition to instructing the young, which is an object of primary importance, it is hoped that a knowledge of the conditions which govern health and well-being, will be widely disseminated, generally.

The Director of Education can guarantee an attendance at each lecture of an aggregate number of 188 teachers divided among eleven stations in the Colony and Ashanti.

SCIENTIFIC RESEARCH.

Dr. W. M. Graham was detailed to investigate the biting flies and ticks of Ashanti, and to make classified collections. His report will be one of considerable magnitude and will require reference to museum specimens and literature at home before its final compilation.

The work upon which he has been engaged may briefly be summarised as follows :—

Making as complete collections as possible of—

The Ashanti diptera,
The Ashanti ticks and fleas,
The Ashanti mosquitoes,

and defining the localities in which they are found ;

Making microphotographs of all perfect blood-sucking diptera captured ;

Identifying and naming specimens sent to him for that purpose by other Medical Officers ;

Describing and drawing some of the agricultural pests which damage cocoa, fruit, &c. ;

Investigating the distribution of the *Glossinæ* in Ashanti ;

Finally, classifying, as far as possible, the collections made.

I append a report on the etiology of guinea worm, which is the result of research work done by him in his previous tour, and a reprint from a contribution to the Annals of Tropical Medicine and Parasitology, Vol. I, No. 3, of November 9th, 1907, on Gold Coast *Entomostraca*.

Dr. A. E. Horn was detailed for special duty in the localities in which the last epidemic of Cerebro-Spinal Meningitis was said to have been most prevalent, in order to investigate the disease. Appendix 3 contains the result of his investigations. Strictly speaking it ought not to appear until the 1908 Annual Report is submitted, but as Cerebro-Spinal Meningitis investigation is a matter of immediate scientific interest, I am impelled to include it in view of its connection with previous work on the subject.

The work was carried on under many difficulties caused by climatic influences on the one hand, and on the other, the timidity, and occasional hostility of a primitive people unused to, and sometimes in fear of white men. Dr. Horn has shown that the epidemic was of the same nature as that which has recently occurred in Europe and America ; and has secured cultures and microscopic specimens of what he is convinced is the same organism as was responsible for the occurrence of the epidemics in those countries, namely, the micrococcus of Weichselbaum. His suggestion of a possible connection between Cerebro-Spinal Meningitis in the North-western portions of Africa and Southern Europe is worthy of serious consideration.

Except in special instances like these, where Medical Officers may be so detailed that the work they undertake will not be interfered with by the coincident performance of other duties, little more can be hoped for, generally, than the ordinary routine work of a station, for the reasons I have given in connection with my remarks on out-station sanitation.

HOSPITALS AND DISPENSARIES.

The stock of drugs, medical comforts, and surgical appliances, &c., has been sufficient ; but some difficulty has been experienced in transporting them to the more distant stations. Arrangements are being made for direct transport of medical stores from England to some of the stations ; this will save a considerable amount of time and also freight charges.

The European Hospital at Accra adjoins and is connected with the Native Hospital. This most undesirable arrangement has obtained since the days when the importance of segregation was not recognised. The erection of a new Native Hospital has been sanctioned, and later on the conditions will be more in accord with the requirements of modern hygiene.

Excepting at Sekondi, Cape Coast, and Kumasi, both European and Native sick are accommodated in the same buildings at some of the other

stations in the Colony. It is not possible to effect immediate radical and costly changes, but more favourable arrangements will be gradually made when feasible. The Axim Hospital, for example, is being dealt with this year.

Certain improvements in the Sekondi Hospital and the addition of an operating theatre were recommended and approved. The improvements consists of the construction of a verandah at the northern end between the bath-room corridor and the Nursing Sister's room, and the addition of a service lift.

The Kumasi European Hospital was completed in February and has proved a great benefit. It is raised from the ground on brick pillars, and is built of brick and thatched with shingles. It consists of four wards, each measuring 16 ft. 8 ins. by 17 ft., surrounded on all sides by a 12-ft. wide verandah. There is a pantry, bath-room and latrine on the back verandah and behind the building are a kitchen and quarters for some of the Native staff.

LUNATIC ASYLUM.

The Lunatic Asylum at Accra is the only one in the Colony. The situation of the present building, behind and close to the European Hospital, and the general accommodation, were considered unsatisfactory, and construction of a new asylum was completed in 1907, but it was not possible, owing to lack of water supply, to transfer the patients to it until early in the present year. It is built of concrete and is well situated, the walls are unclimbable and they enclose two rectangular spaces divided into two airing courts, one for males and one for females. The former measures 250 by 150 feet and the latter 131 by 150; around these are built dormitories, hospitals, wash-houses, latrines and urinals. There is accommodation for 94 male and 38 female patients. The administration block consists of a dispensary and office, store, gate-keeper's room, night-warder's room, and kitchen. The quarters for the staff are outside the walls of the main building. Covered sheds are provided in the airing courts to accommodate the patients during wet weather and the mid-day heat; and those of them who are considered likely to be benefited thereby are provided with healthful and congenial work.

During the year 32 new patients were admitted of whom 29 were males and three females. The daily average number during the year was 64·50, classified as follows :—

Acute Mania	...	...	19	males.	7	females.
Melancholia	...	...	7	"	—	
Chronic Dementia	...	...	17	"	3	"

Idiotic, Paralytic, and Epileptic 8, and undiagnosed 3. Twelve male patients died and one female; the deaths occurring amongst old cases and those newly admitted in a debilitated and exhausted condition. They were of the following classes :—

Maniacs	...	...	..	...	...	5
Epileptics	...	...	...	...	...	4
Melancholiacs	...	...	...	...	...	2
Dements	...	...	...	...	...	2
					Total	13

One patient whose condition was sufficiently improved to warrant his enlargement, and 16 cured, were discharged, as against 3 cured and 10 relieved in 1906; and it is not unlikely that even better results may be obtained in their present more hygienic accommodation and environment.

GAOLS.

The general health of prisoners is reported as good. There were in all, in the various gaols, 13 deaths as against 10 in 1906 and 17 in 1905.

The ventilation of gaols is reported as satisfactory and the diet good and sufficient.

The Sekondi gaol was completed. It is exceptionally well planned and constructed, but the site has been adversely commented on : it can be improved by attention to the drainage of its immediate surroundings.

DISEASES OF SPECIAL INTEREST.

BLACKWATER FEVER.—Shows an increase in the number of cases and a higher mortality rate. There were 19 cases in 1905, 22 in 1906 and 27 in 1907. The case mortality in each year respectively was, 10·52 per cent., 13·63 per cent. and 14·81 per cent.

MALARIAL FEVER.—The records for the same years show, 395, 377, 2,327, with a case mortality of 4·05 per cent., 1·06 per cent. and 0·21 per cent. The increased number of cases in 1907 is accounted for by the fact that hitherto extern cases have not been included in the nosological table. This applies also to the following diseases mentioned.

DYSENTERY.—In the same order the numbers were 111, 97, and 260, with case mortality of 19·81 per cent., 15·46 per cent., and 3·46 per cent. The disease was not, therefore, characterized by any great degree of severity in 1907.

GUINEA WORM.—The total number of cases was 1,299 as against 77 and 63 in the two previous years.

CANCER.—Only one case of malignant disease was reported ; its termination is not recorded. There were 5 cases in 1905 and 4 in 1906.

BERI-BERI.—Shows a marked improvement as compared with the preceding year. The case mortality was 9·09 per cent. as against 26·31 and 55 per cent. in 1905 and 1906.

CERERO-SPINAL MENINGITIS.—The only available records show 9 cases and 4 deaths in 1907. During the Harmattan season a severe epidemic occurred in the north-western portion of the Northern Territories and the mortality is considered to have been very great.

SLEEPING SICKNESS.—The greatest number of cases were seen in Kumasi. There were 23 extern cases and 9 were treated in hospital ; the remaining cases, making a total of 34, occurred in the Northern Territories.

One of the Kumasi cases was a European reported as having recovered under the atoxyl treatment. The diagnosis was not confirmed microscopically. The case mortality of those treated in hospital for the years 1905, 1906 and 1907 was 57·14 per cent., 100 per cent. and 55 per cent.

SMALL-Pox.—No severe outbreak of this disease appears to have occurred since 1901.

The records show :—

		Cases.	Deaths.
1901	...	893	140
1902	...	244	33
1903	...	37	11
1904	...	62	1
1905	...	25	1
1906	...	35	2
1907	...	4	—
TOTALS		1,300	188

The total number of vaccinations performed was 1,082, of which 869 were successful.

METEOROLOGICAL.

Attention has been drawn to the variation in the rainfall at different stations in the Colony. Axim and Aburi observations show the highest, and Keta and Accra the lowest records. The total rainfall was greater than in 1906.

		1906.	1907.
Axim	...	66.99 inches	94.84 inches
Aburi	...	49.13 "	50.73 "
Accra	...	20.64 "	36.67 "
Keta	...	15.74 "	26.46 "

The highest solar and shade maximum temperatures in the Colony were registered at Aburi, the former in November and the latter in March, and the lowest shade minimum at Axim in May.

W. H. LANGLEY,

Principal Medical Officer.

MEDICAL REPORT ON KUMASI FOR THE YEAR ENDED
31ST DECEMBER, 1907.

During the year, 128 Europeans were resident in Kumasi. Of these :—

74 were Government Officials,
7 „ Missionaries,
44 „ Merchants,
3 „ Wives of Officials.

The average number of months of the year served by each official amounted to 4·63.
The average number of months of the year served by each non-official amounted to 6·25.
The general average was 5·33 months.

In addition to the above residents, 189 Europeans passed through Kumasi.

The daily average number of European Officials has been 27·71.

The total number of European Officials on the sick list amounted to 79, this number includes those who were on the sick list during manœuvres, who numbered twelve.

But for the number of cases of sickness whilst the troops were on manœuvres, the total number of officials on the sick list would only have amounted to 67, which would compare very favourably with 78 in 1906, 89 in 1905 and 115 in 1904.

The daily average number of European non-officials resident in Kumasi has been 28·12.

There was no death amongst the Europeans in Kumasi during 1907, but five Europeans were invalidated.

TABLE OF INVALIDINGS.

Description.	Residence.	Disease.	Invalided to.
1 Official	Kumasi	Neuritis	England.
1 „	„	Anæmia, etc.	Canary Islands.
3 Non-officials	„	Malarial Cachexia ...	England.

The invaliding rate per thousand works out at :—

European Officials	... ... ...	27·02
European Non-officials	... ... ...	55·55

Table of diseases from which European Officials suffered from in Kumasi :—

Abscess	...	...	...	...	...	1
Anæmia	...	...	...	...	...	1
Adenitis	...	...	...	...	...	1
Hæmoglobinuric Fever	...	...	...	...	...	1
Bronchial Catarrh	...	...	...	...	...	1
Bilious Remittent Fever	...	...	...	...	...	1
Conjunctivitis	...	...	...	...	...	1
Colic	...	...	...	...	...	1
Cystitis	...	...	...	...	...	1
Contusion of Spine	...	...	...	...	...	1
Diarrhœa	...	...	...	...	...	1
Debility	...	...	...	...	...	2
Eczema	...	...	...	...	...	2
Enteritis	...	...	...	...	...	1
Fracture of Clavicle	...	...	...	...	...	1
Furuncle	...	...	...	...	...	2
Gastric Catarrh	...	...	...	...	...	1
Hæmorrhoids	...	...	...	...	...	2
Intermittent Fever	...	...	...	...	...	6
Neuritis	...	...	...	...	...	1
Otitis Media	...	...	...	...	...	1
Ptomaine Poisoning	...	...	...	...	...	1
Pneumonia	...	...	...	...	...	1
Remittent Fever	...	...	...	...	...	28
Rheumatic Arthritis	...	...	...	...	...	1
Syncope	...	...	...	...	...	1
Synovitis	...	...	...	...	...	2
Tonsilitis	...	...	...	...	...	2
Ulcer	...	...	...	...	...	1
					67	

On manœuvres—Colic	...	...	...	...	...	1
Remittent Fever	...	...	...	...	...	11
Total	...	...	...	...	79	

During the year 68 non-official Europeans were attended for the following diseases :—

Anæmia	...	...	...	...	...	2
Acute Alcoholism	...	...	...	...	...	1
Blackwater Fever	...	...	...	...	...	1
Bronchitis	...	...	...	...	...	4
Conjunctivitis	...	...	...	...	...	1
Dysentery	...	...	...	...	...	1
Diarrhoea	...	...	...	...	...	1
Furuncle	...	...	...	...	...	1
Gonorrhœa	...	...	...	...	...	4
Gonorrhœal Rheumatism	...	...	...	...	...	1
Gastric Catarrh	...	...	...	...	...	15
Hæmorrhoids	...	...	...	...	...	2
Hay Fever	...	...	...	...	...	2
Injury	...	...	...	...	...	2
Liver Abscess	...	...	...	...	...	2
Malarial Cachexia	...	...	...	...	...	3
Neuralgia	...	...	...	...	...	5
Parasitic Diseases	...	...	...	...	...	8
Remittent Fever	...	...	...	...	...	8
Rheumatism	...	...	...	...	...	1
Sleeping Sickness	...	...	...	...	...	1
Tonsilitis	...	...	...	...	...	1
Ulcer	...	...	...	...	...	1
Total	...					68

HEALTH OF TROOPS AT CAMPS OF EXERCISE.

Whilst on manœuvres during the early part of the year a considerable amount of sickness was experienced among the European Officers and N.C.O.'s. No less than eleven cases of Remittent Fever occurring.

Dr. Cookman, who accompanied the troops on manœuvres, attributed this largely to the lack of precautions taken by the Europeans to segregate themselves from the Natives, as both on the journey there and back, and largely during manœuvres, the European Officers and N.C.O.'s lived in Native houses in crowded Native villages.

In 1908 it is hoped that this practice will not be repeated, as both Officers and Non-Commissioned Officers will be provided with tents, and camp sites will be prepared outside the villages.

THE EUROPEAN HOSPITAL.

The European Hospital was opened on the 26th of May, and up to the end of the year received 31 patients. Of these 27 were resident in Kumasi, the remainder came in from Out-stations.

The patients consisted of 20 officials, 10 merchants and 1 miner.

Table of Diseases of those admitted to the European Hospital :—

Acute Alcoholism	...	...	...	...	...	1
Acute Tonsilitis	...	...	...	...	...	1
Abscess	...	...	...	...	...	1
*Bilious Remittent Fever	...	...	...	...	...	1
+Hæmoglobinuric Fever	...	...	...	...	...	2
Conjunctivitis	...	...	...	...	...	1
Diarrhoea	...	...	...	...	...	1
Dysentery	...	...	...	...	...	1
Eczema	...	...	...	...	...	1
Fractured Clavicle	...	...	...	...	...	1
Gonorrhœa	...	...	...	...	...	3
Gonorrhœal Rheumatism	...	...	...	...	...	1
Gastric Catarrh	...	...	...	...	...	2
Injury to Spine	...	...	...	...	...	1
Intermittent Fever	...	...	...	...	...	3
Peripheral Neuritis	...	...	...	...	...	1
Remittent Fever	...	...	...	...	...	8
Ulcer	...	...	...	...	...	1
Total	...					31

*Came in ill from the Northern Territories.

+One case came in from the Northern Territories.

The average period spent in Hospital by each patient was six days. In December a European Nursing Sister was detailed for duty at the European Hospital, and consequently the usefulness of the Hospital has been greatly increased.

Owing to the kindness of Colonel Carter in lending the Pioneers, we were enabled to utilise one end of the European Hospital as temporary Quarters for the Nursing Sister.

STAFF DURING THE YEAR.

During the year the following Officers have been stationed in Kumase :—

Europeans—Dr. Montgomery, Acting Senior Medical Officer; Dr. Rice, Senior Medical Officer; Drs. Bhuttacharji, White, and Cope, Medical Officers; and Miss A. Lee, Nursing Sister.

Natives—Mr. Erskine; Mr. Hagan and Mr. Bannister, Dispensers. Mr. E. K. Dogbatse, 1st Class Dispenser Pupil; Mr. O. M. Rottman, 2nd Class Dispenser Pupil and Mr. T. B. Ashong, 2nd Class Dispenser Pupil. 1st Class Dresser I. M. Bennett; 2nd Class Dressers S. Victor, S. H. Attram, H. A. Offosu and S. B. O. Marshall. 3rd Class Dressers J. A. Sennie and J. E. Williams.

HEALTH OF NATIVE STAFF.

Attached is a report by Dr. R. O. White, who has, for the greater part of the year, been in charge of the Native Hospital, on the Health of the Native Staff and the work done at the Native Hospital.

From this it will be seen that at this Hospital at least twice as much work is done as at any other Hospital in the Colony.

KUMASE PRISON.

The health of the prisoners has been exceptionally good. No deaths occurred amongst the prisoners during the year.

On the 1st of November an Infirmary was opened in the Prison. This has been of great service, and has relieved the congestion at the Native Hospital.

SANITATION.

The sanitary condition of the town of Kumase has been satisfactory.

Eight cases of Sleeping Sickness were treated—seven Natives and one European. These cases undoubtedly demonstrated the curative value of Atoxyl in this disease.

DISCOVERY OF TSETSE FLIES IN KUMASE.

In view of the presence of Sleeping Sickness in Kumase, the most important event of the year has been the discovery of Tsetse flies in Kumase.

They were first found in this manner ;—

During the course of a lecture to the Native staff some Tsetse flies were shown to them, and a reward of ten shillings was offered to the first person who would bring a similar fly caught in Kumase. Within a week two Tsetse flies were brought.

The first pronounced by Dr. Graham to be a Glossina palpalis, was caught in the Native Hospital.

The second specimen, identified by Dr. Graham as a Glossina pallicera, was caught on the Polo Ground.

Subsequently Dr. Graham spent about ten days in Kumase, and during that period found Tsetse flies on all the roads leading out of Kumase and elsewhere, notably in the European Hospital and in the Medical Officers compound.

ANIMALS EFFECTED WITH TRYPANOSOMIASIS.

Repeated examinations have been made of the blood of horses, cows and sheep, and Trypanosomes were found as follows :—

In Horses, in about 50 per cent.
" Cows, " 30 "
" Sheep, " 15 "

Which shews the necessity of carefully observing any new case of Sleeping Sickness.

We now have the following facts to consider in connection with this disease :—

1. Eight cases were observed during the year, one of which was undoubtedly endemic.
2. Tsetse flies are to be found in and around the town.
3. The constant presence of animals suffering from Trypanosomiasis.

We therefore have in Kumase apparently all the conditions necessary for the transmission of Trypanosomiasis from man to man, and should there be any marked increase in the number of cases coming under observation it may be necessary to construct a fly-proof building in which to isolate them.

DRAINS.

During the year steady progress has been made with the work of laying down stone drains, pointed with cement, along the sides of the main street, and I believe that out of the small sum voted for Town improvements in 1908, enough will be available to finish the work in the main street.

This work is costly, averaging, I believe, 3s. 6d. to 4s. a foot, but it is very necessary, and I hope that in 1909 a much larger sum will be allotted for this purpose.

Kumase is built on the slopes of several hills, and during the rains the water rushes down the sides of the streets in swift torrents, scouring out and forming pits in the soft surface soil of the dug-out trenches at the sides of the streets. Consequently numberless more or less permanent puddles are formed, necessitating, during the wet season, constant personal inspection and vigilance.

The provision of permanent stone drains down the sides of the streets would obviate all this, and do much towards rendering more healthy the Native Town, in which the European merchants live unsegregated from the Natives.

WATER SUPPLY.

The water supply has been good and abundant, and both the Natives and Europeans have been remarkably free from diseases which are usually considered to be water-born.

There has been a number of cases of Guinea worm, but most of these were soldiers and carriers who were probably infected elsewhere.

The water from the King's Well is now used by the Gold Coast Regimental Soda Water Factory. This has been of great benefit to the European community here, as we now get excellent soda water at 2d. a bottle, whereas formerly, owing to high railway freights and breakages, it used to cost 9d. to 1s. a bottle.

During the year the Natives were provided with good water at four new sites as follows :—

1. By a well near the railway crossing on the Cape Coast Road.
2. By a well at a point where the Kintampo Road joins the town.
3. By a well at the Zongo.
4. By a reservoir on the south-east side of the town, where the water issues as a spring from the side of a cliff.

At each of these places there were formerly numerous surface pits from which the Natives obtained their water supply. These were closed after provision had been made for an ample supply of good water as stated above.

Additional wells are needed at the Zongo, on the N.E. side of the lines, and near the Railway Station.

LAUNDRY FOR EUROPEANS.

Near No. 3 water reservoir a laundry has been constructed. This consists of a concrete floor with drains round it, covered in by a corrugated iron roof and containing benches running round three sides of it. Tubbs are also provided.

In this building the clothes of Europeans only are washed, and thus the risk is lessened of catching skin diseases.

Early in the year before the laundry was in use some cases of Scabies occurred amongst the Europeans.

WASHING PLACE FOR NATIVES.

Near No. 4 water reservoir a washing place for Natives has been constructed. Here an area of about 30 square feet has been prepared with ironstone, the interstices being filled with cement and surrounded with a stone drain. This is a very popular resort of the Natives who crowd the place all day doing their washing.

In 1908 it is hoped to construct several more washing places near other water reservoirs or wells. Then it will be possible to prohibit the washing of clothes in private compounds, and the creation of insanitary puddles of water about the town.

SWAMPS.

Over the greater portion of the swamps Sunflower seeds were planted and on the whole did very well, except in certain small areas which are under water during the rains. Three bushels of Giant Sunflower seeds were obtained, and about half of them were planted. Two bushels of seeds were gathered and dried, and these will be planted, together with the remains of the original purchase, early in the rains. Many flowers were allowed to ripen and rot *in situ* in the hope that they may re-sow themselves.

In the meantime, before the rains come, it is hoped to sink the main drains in the swamp that crosses the Kintampo and Mampon Roads two feet, and by so doing thoroughly drain the whole area even in the height of the wet season.

The other swamp that extends from the rifle range past the Carrier Lines and across the Cape Coast Road to the Botanic Station have also been drained, and in that portion between the Carrier Lines and the European Water Supply, which was formerly covered by two feet of water in the rains, a garden has been made.

VEGETABLE GARDEN.

An excellent Vegetable Garden has been made in a portion of the reclaimed swamp and has yielded enough vegetables to supply the European Hospital, the civilian officials and to some extent the Officers' Mess and the European Non-Commissioned Officers. Some cucumbers from the Garden obtained 1st prize at the Sekondi Exhibition.

The following vegetables were grown successfully from seeds received from Messrs. Sutton, viz.:—Cabbages, Lettuce, Radishes, Kohl Rabi, Tomatoes, Beet Root, Mustard and Cress, Scarlet Runners, Telegraph Cucumbers and Australian Apple Cucumbers. I particularly commend the variety of cucumber known as the Australian Apple Cucumber, as it seems to be suited to this climate. Three plants supplied for many weeks between 90 and 100 cucumbers a week.

REFUSE.

The refuse collected daily in this town have been deposited in the swamp and kept in a state of ignition. The refuse collected from the lines is taken down the Sanitary Railway and burnt.

It is hoped, when the destructor, allowed for in the 1908 estimates, is working, to destroy the refuse and do away with these unsightly and unsavoury heaps and pits.

LATRINE SYSTEM.

In the town and lines there are now 25 Latrine Houses containing 277 pans. The Latrine Houses are built of corrugated iron and have stone floors pointed with cement.

The pans are emptied by prisoners twice daily into pits dug outside the town and earth placed in these pits twice daily.

A gang of men is also employed, keeping the Latrine Houses supplied with earth and others in placing earth in the pans.

The contents of most of the latrine pans from the lines are disposed of by the Sanitary Railway.

VACCINATION.

195 vaccinations were made, of which 125 were successful.

This shows a much better percentage of successes than last year which is doubtless owing to the lymph having been sent direct from England instead of via Accra as formerly.

SLAUGHTER HOUSE.

The Slaughter House at the Zongo has been improved by lengthening the stone drains leading from it to the swamp by 100 feet and erecting benches for the butcher to cut up the meat on.

TABLE SHOWING SLAUGHTER HOUSE RETURNS FOR 1907.

Month.	Cattle.	Sheep.	Goats.	Pigs.	Amount.		
					£	s.	d.
January	196	41	165	19	35	0	6
February	215	37	156	18	37	11	0
March	236	62	296	22	44	17	0
April	205	64	270	17	39	10	6
May	188	83	294	13	37	19	0
June	213	93	374	21	44	3	0
July	207	99	299	25	41	12	6
August	198	78	204	17	37	3	6
September	190	47	157	13	33	18	6
October	188	30	155	14	33	3	6
November	143	24	133	18	25	17	0
December	181	40	176	35	33	8	6
Totals	2,360	698	2,679	232	£444	4	6

This shows an increase of £68. 3s. 0d. on the Returns for the previous year.

PROSECUTIONS MADE BY SANITARY DEPARTMENT.

The following Table shows a number of Prosecutions, Convictions and amount inflicted in Fines during the year :—

Month.	Number of Prosecutions.	Number of Convictions.	Fines Collected.		
			£	s.	d.
January	8	8	2	10	0
February	23	23	5	14	0
March	64	59	22	10	0
April	22	22	13	10	0
May	23	23	13	12	6
June	26	18	8	7	6
July	9	9	3	10	0
August	13	13	5	5	0
September	31	31	9	4	0
October	5	5	1	10	0
November	11	11	8	5	0
December	15	14	5	7	6
Totals	250	236	£99	15	6

INSECTS, FLIES, &c., FOUND DURING THE YEAR.

In addition to the *Glossina palpalis* and the *Glossina pallicera* already mentioned, the following Ticks were found on the Cattle, slaughtered and submitted to Dr. Graham who pronounced them to be respectively :—

- Amblyomma variegatum.*
- Boophilus decoloratus.*
- Boophilus annulatus.*
- Hyalomma Egyptium.*
- Hæmaphysalis Leachi.*

A fly was also given to Dr. Graham who pronounced it to be the Congo Floor Maggot Fly.

Kumase has the reputation of being one of the cleanest towns in West Africa. It has been a great pleasure to me to endeavour to keep it in that condition of cleanliness to which it has been brought by the labour of my predecessors, and in this matter much less would have been possible but for the ready help and sympathy which I have always received both from the Chief Commissioner and the Officer Commanding the Gold Coast Regiment.

OUT-STATIONS.

The Out-stations in Kumase are :—

Obuase.
Sunyani.
Kintampo.

As the Medical Officers in these stations have each submitted their Reports to you, it is unnecessary for me to add to them.

(Sgd.) THOS. E. RICE,

Senior Medical Officer.

MEDICAL REPORT ON THE NORTHERN TERRITORIES FOR THE YEAR ENDED 31st DECEMBER, 1907.

GENERAL HEALTH.

The year 1907 has been rendered remarkable for the large increase in the number of cases of Blackwater Fever; five cases occurred during the year with one death, two being invalidated to England and the remaining two completed their tour of service.

The number of European Officials actually placed on the Sick List was 67 as compared with 101 during the year 1906, the population being practically the same.

No case of Bilious Remittent Fever occurred throughout the Northern Territories, and I consider the attacks of Malarial Fevers were of mild and a shorter duration than in previous years.

The first case of Enteric Fever which has occurred in the Northern Territories since the occupation eleven years ago was reported at the early part of the year under review.

The official is supposed to have contracted the disease through drinking unboiled milk on his way up country, and after 119 days on the Sick List was invalidated to Kumase, and thence home.

The following table shows the comparative health of the stations in the Northern Territories for the year, and includes all officials placed on the Sick List.

Station.	Strength.	Number placed on Sick List.	Average number of Days on Sick List.	Invalided.	Died.
Gambaga ...	5·05	27	9·62	1	—
Navarro ...	1·0	5	7·8	—	1
Tumu ...	1·7	7	2·8	—	—
Lorrha ...	1·3	1	3·0	—	—
Wa ...	2·07	8	2·37	—	—
Bole ...	1·7	2	5·0	—	—
Salaga and Yei ...	3·9	10	6·8	1	—
Tamale ...	1·5	7	3·8	1	—
 Totals ...	19·22	67	4·71	3	1

I also attach list of diseases from which officials suffered :—

Remittent Fever	...	...	...	...	...	...	31
Intermittent Fever	...	...	...	...	...	...	12
Blackwater Fever	...	...	...	...	...	...	5
Nasal Catarrh...	...	...	...	...	...	...	2
Enteric Fever	...	...	...	...	...	...	1
Bronchial Catarrh	...	...	...	...	...	...	3
Dysentery	...	...	...	...	...	...	1
Chronic Gastritis	...	...	...	...	...	...	1
Injury to Back	...	...	...	...	...	...	1
Diarrhoea	...	...	...	...	...	...	1
Mumps	...	...	...	...	...	...	1
Influenza	...	...	...	...	...	...	2
Incised Wound	...	...	...	...	...	...	1
Volvulus	...	...	...	...	...	...	1
Debility	...	...	...	...	...	...	2
Bilious attack	...	...	...	...	...	...	2
Total	...	...	...	...	...	...	67

Three Officials were invalidated from the following causes as compared with five in 1906 :—

Enteric Fever.	...	...	...	...	...	...	1
Blackwater Fever	...	...	...	...	...	...	2
Total	...	...	...	...	...	...	3

NATIVE OFFICIALS.

The health of the Native Staff was most satisfactory throughout the year, one Clerk was invalidated, and no death occurred.

The average number of days on the Sick List for the year was 5·48.

NATIVE TROOPS.

The health was good during 1907, and I am glad to be able to report that no death from Cerebro Spinal Meningitis occurred amongst the men of the Gold Coast Regiment or Northern Territories Constabulary.

Owing to the 2nd Battalion of the Gold Coast Regiment being disbanded, I find it necessary to compile two sets of figures.

Month.	"C" Company Gold Coast Regiment.				Northern Territories Constabulary.			
	Strength.	Average daily number on Sick List.	Invalided.	Died.	Strength.	Average daily number on Sick List.	Invalided.	Died.
January ...	180·00	14·78	—	—	67·00	3·69	—	—
February ...	170·07	5·95	—	1	55·60	1·52	—	—
March ...	156·32	5·80	1	—	72·00	3·50	—	—
April ...	159·13	5·51	—	—	69·3	2·52	1	—
May ...	157·74	5·99	—	1	61·22	3·18	—	—
June ...	165·4	6·53	1	—	64·93	3·40	—	—
July ...	168·00	6·76	1	—	71·45	3·98	—	1
August ...	150·79	7·30	—	1	73·87	2·63	1	—
September ...	171·10	7·32	—	—	75·70	1·89	—	—
October ...	171·00	7·95	1	—	77·67	1·47	—	1
November ...	165·63	7·56	—	—	74·96	3·46	1	—
December ...	167·06	8·25	—	—	79·65	3·57	—	—

CARRIERS.

Owing to a large reduction of carriers in Gambaga and Out-stations it is unnecessary to make any remarks as regards their health ; and I have included any who were sick and required attention in the Hospital figures.

TOWNSPEOPLE.

It is satisfactory to learn that the Natives are seeking medical and surgical treatment in increasing numbers. The principal diseases for which they apply for relief are as follows :—

Ulcers of a very severe and obstinate type, Guinea Worm, Bronchial Catarrh during the Harmattan season, Craw-Craw, and Constipation.

EPIDEMICS.

The number of cases of Cerebro-Spinal Meningitis which occurred was much less than in the two previous years, and the disease was more confined to the North-West District ; no cases being reported from any of the other districts in the Protectorate.

During the month of September it was reported that a number of deaths had taken place at a place called Brumase in the Gonja District and lying two days' march west of Salaga.

Two Medical Officers were sent to investigate the disease, and Dr. Gush, after making some experimental and careful inquiries, came to the conclusion that the disease was Anthrax. I attach a copy of Dr. Gush's report.

SANITATION.

It is satisfactory to note that on the whole the Sanitary condition of all the stations in the Northern Territories shows improvement ; it is difficult to deal from a sanitary point with some of the new stations, which have only been formed since the beginning of the year and for months have been without a Medical Officer.

The European Quarters have been kept clean and in good condition.

WATER.

The water at some of the stations is at present unsatisfactory, especially during the dry season.

I hope to see this remedied shortly by the sinking of good wells, which should be rendered mosquito proof.

GARDENS.

Nearly all the stations have gardens which are looked after by the Medical Officer of the station, and except for a couple of months during the dry season a fair supply of vegetables can always be obtained. At Gambaga and Tamale larger gardens exist which are able to supply vegetables throughout the year.

The chief things grown are :—

Tomatoes, French beans, Garden Eggs, Carrots, Cucumbers, and Kohl Rabi.

This year Bananas and Pawpaws have been a great success in Gambaga.

At Gambaga the supply has been so large that I have been able to give the Native Clerks, for several months, some of the above named fruits.

METEOROLOGICAL.

The rainfall for 1907 was four inches less than the average for the last six years, and occurred much later than usual.

The Natives predicted a late and small rainy season, and stated that this occurs every fifth year.

The Harmattan blew strongly during the first two months of the year and caused a good deal of bronchial trouble.

Guinea Worm as usual was prevalent during the rainy months.

(Sgd.) H. TWEEDY,

Senior Medical Officer.

REPORT ON THE BRUMASE EPIDEMIC, 18TH NOVEMBER, 1907.

The epidemic appears to have broken out about the commencement of September and, seemingly, all the deaths which took place occurred during that month. It first made its appearance in a young bull at Brumase, this bull had been bred in the place and the natives of Brumase are confident that the epidemic was not introduced by outside influence. The disease spread rapidly, and in man and animals always proved fatal in about 24 to 48 hours. In all the human cases one or more local lesions were present, but the natives state most emphatically that no sore was ever found on any affected animal.

Animals, upon becoming affected, ran into the surrounding bush crying loudly in evident pain. The natives were afraid to go near the animals until they were dead.

MORTALITY TABLE.

Town.	Human	Cattle.	Donkeys.	Sheep.	Goats.	Dogs.
Brumase	18	7	—	27	—	—
Gida Saidu	1	—	—	14	—	—
Yantinto	1	3	—	—	—	—
Tarafa	1	—	—	12	—	1
Totals ...	21	10	—	53	—	1

It is a very noteworthy fact that no donkeys or goats were affected ; they are presumably immune.

ESTIMATED DEATH RATE IN BRUMASE ALONE.

	Men.	Cattle.	Donkeys.	Sheep.	Goats.	Dogs.
Estimated No.	50	200	5	100	150	10
No. of deaths	18	7	—	27	—	—
Rate per cent. ...	36·0	3·5	0·0	27·0	0·0	0·0

As Brumase is in the Tsetse zone no horses are kept there—neither are there any swine in the district. The epidemic seems to have almost died out during the month of October, and during the first week of November only three very mild cases could be found in the district surrounding. The three cases referred to all occurred in children. Their ages were about 12, 10 and 8 years. They were all boys.

The first case age 12, had been attacked by the epidemic ten days before I saw him. He had two sores, one on the right occipital region of the scalp, and the other on the upper part of the posterior surface of the arm. Both were encrusted, but there was no pus. Each was about the size of a florin. Neither presented the typical appearance of malignant pustule.

The other two cases were very similar to the above in appearance, each had been ill for seven days, they did not belong to the same family or sleep in the same house. Each had one sore only, and in each case it was situated on the back part of the leg just below the popliteal region. None of these cases had been very ill, and all of them were running about, but the natives assured me that the primary appearance of the pustule in these cases was just the same as in those of the men who had died.

Excision of these sores was out of the question as they had existed for so long, they were therefore all scraped, and film preparations were made from the exudate, and treated with moist carbolic dressings. The wounds rapidly improved under this antiseptic treatment. The film preparations were obtained by Loeffler's Methylene blue and also by Gram's method (Aniline Gentian violet, Iodine and Bismarck brown). In most of the films large bacilli with a granular appearance, with square ends, some in chains, were present. They were motionless. I was unable to detect their presence in blood films. A sheep was secured and some blood of the patients was injected into it. A small wound was also made in the region of the sheep's buttock, and some of the scrapings and exudations from the patients were rubbed in and then left in contact with the abraised wound on the sheep. The sheep continued healthy and on the fourth day it was killed. A post-mortem failed to reveal any haemorrhages in the animal's spleen, neither could haemorrhages nor serious inflammations be found elsewhere. The blood was normal in colour and presented no unusual appearances under the microscope. The glands were not affected.

I therefore formed the opinion that the attenuation of the virus had reached the point at which it was now incapable of overcoming the ordinary resisting powers of a healthy animal, and I did not consider it necessary to take any precautions beyond warning the Chief of Brumase to at once notify the Commissioner at Salaga should any serious case again occur.

I feel confident that the energy of the Brumase epidemic has expended itself.

(Sgd.) HOWARD W. GUSH,

Medical Officer, Tamali.

REPORT ON GUINEA WORM.

During the early years of Colonial Service my attention was forcibly directed to the economic importance of Guinea Worm disease in the Gold Coast, but my time was so occupied with non-medical duties that I was unable to make any exact study of the subject. I learned however that the disease caused a larger annual loss to Government than all other native diseases in the aggregate.

On my appointment to Gambaga I had more leisure, and I found there the material for study afforded by a large military force, all the members of which were under constant medical observation.

On my return home on leave I embodied the result of a year's study in a paper read before the General Meeting of the British Medical Association in the Tropical Section. This paper was subsequently published in the Journal of the Association. The conclusions then arrived at may be summarised as follows:—

1. Guinea Worm disease is of great economic importance on the Gold Coast, as it causes the largest annual admission to the Sick Lists in the various native services maintained by the Colony.
2. There is a month of maximum manifestation of Guinea Worm in man, and from this month forwards and backwards the incidence of the disease declines to zero.
3. The incubation period of the disease in man is about 10 months.
4. Certain changes take place annually in the distribution of the Cyclops host, and these variations in distribution coincide with variations in the incidence of the disease.

During this study of the disease I had become convinced that an advance in prophylaxis was only to be made by acquiring an exact knowledge of the life history of each native species of Cyclops.

I found unfortunately that nothing was known of the West African Entomostraca, and that there was therefore no book treating of the native species. Being sent to Obuassi where I had some leisure, I began a classification of the various indigenous forms. On my return home on leave I completed my work and had it published by the Liverpool School of Tropical Medicine in their Annals. I am therefore not summarising the contents of this article. Naturally prophylaxis is the distant mark aimed at in any such investigation, but the means of prophylaxis can only be devised after the acquiring of exact knowledge.

In order to render my subsequent remarks on this subject intelligible, it will be necessary to preface them by a short account of the life history of the Guinea Worm.

A vesicle appears upon the skin (usually of the leg). The vesicle ruptures disclosing a shallow ulcer at the bottom of which a small opening can be seen. Through this opening the female Guinea Worm protrudes her uterus, and roused especially by the stimulus of a contact with water, discharges her embryos. The embryo is a minute worm, which on reaching the water swims rapidly away. Should it meet with a member of the family of the Copepoda, the worm enters the body of the crustacean and there begins its parasitic career.

The embryo grows and moults several times, and at the end of about five weeks it has completed its crustacean stage of development, and is ready for the change of host without which no further development takes place.

The change of host is accomplished by the transference to the stomach of a mammal of the infected Cyclops. The vehicle is usually drinking water. In the stomach the crustacean is digested and the worm set free. After mating, the males are believed to die, but the impregnated female bores her way through the tissues and reaching at length the surface gives rise to a vesicle on the skin such as this account commenced with.

From a consideration of this life history it will be evident that the subject of prophylaxis can be approached by two different routes.

- (i.) By dealing with the mammal host, *i.e.* Man.
- (ii.) " " " crustacean host, *i.e.* Cyclops.

The first method appears impracticable as it is impossible to control the action of thirsty men. I propose therefore to discuss the second method.

The crustacean is infected by an embryo discharged into the water from the body of a mammal. Such discharge is stimulated by contact with water, and usually occurs while the mammal is standing in the water of a well or stream for the purpose of drinking, washing, or drawing water.

If therefore all contact between the body of the infected mammal and the water be prevented, the Guinea Worm embryos would not be discharged into the water and the infection of the crustacean would not take place.

In towns such contact can be prevented by the construction of deep wells; such a well should be protected by a parapet wall built round the mouth so that water spilled upon the ground near the mouth could not run back into the well. By preference the water should be raised by a pump, for the use of a bucket and rope is open to the objection that the bucket may be used to wash in, or may be set down on a contaminated surface near the well, and may subsequently carry embryos into the well on being lowered into the water.

At Accra the incidence of the disease is very severe, and the local conditions are almost ideal for the propagation of the malady.

Large open pools (Kimbu tank, Christiansborg tank, &c.), from which it is difficult to draw water without standing in it, have been constructed by the Government for the supply of water to the Native population, and in these pools man or animal can be seen standing every day.

In small villages, where at present the expenditure on the construction of suitable wells is not warranted, it is quite possible that prophylactic measures requiring no expenditure might be devised, were all the facts concerned in the propagation of the disease known. It would then be possible to point out the water sources that were dangerous, and probably also the special months of the year during which the drinking of water from this source would cause the disease.

The prophylactic measures indicated are :—

a. The prevention of contamination of drinking water by the construction of deep, closed wells protected by a parapet and provided with a pump to raise the water, or the supply of drinking water by gravity in public standpipes in the streets, as at Freetown.

b. The filling in of the existing pools, such as the Kimbu tank, &c.

These measures are those dictated by our present incomplete knowledge of the disease, but it is very possible that they are unnecessarily stringent and expensive for the following reasons :—

1. It appears to me very probable that Guinea Worm infection is acquired during one or two months of the year, and that during the other months collections of water, such as the Kimbu tank, might be made use of with impunity.

2. It appears to me probable that only a special species of Cyclops can transmit the disease and that water supplies in which this species of Cyclops is absent could be used without danger of contracting Guinea Worm.

Unfortunately these two generalisations are not yet established. They are based upon particular observations made during the classification of the native Copepodæ. They both still require experimental proof, and such proof is attended with very great experimental difficulties, and can only be attempted during certain months of each year.

(Sgd.) W. M. GRAHAM,

Medical Officer.

THE PRINCIPAL MEDICAL OFFICER,

ACCRA.

Certified true copy,

A. G. RICKETTS,

22nd May, 1908.

ACCRA.

METEOROLOGICAL RETURN FOR THE YEAR 1907.

MONTH.	TEMPERATURE.						Amount in Inches.	Degree of Humidity.	General Direction.	Average Force.	REMARKS.
	Solar Maximum.	Minimum on Grass.	Shade Maximum.	Shade Minimum.	Range.	Mean.					
January ...	138.25	64.51	87.09	63.06	24.03	75.07	.14	90.45	...	...
February ...	143.78	59.85	86.92	65.03	21.89	75.97	.30	91.03	...	...
March ...	146.38	73.06	87.74	73.87	13.87	80.80	2.24	72.19	...	...
April ...	145.13	73.73	86.10	71.80	14.30	78.95	4.62	74.54	...	...
May ...	146.70	73.90	85.25	73.96	11.29	79.60	10.10	70.64	...	...
June ...	140.83	71.21	82.93	70.63	12.30	76.78	13.88	80.53	...	...
July ...	135.58	72.03	80.58	72.25	8.33	76.46	3.73	81.58	...	...
August ...	137.74	68.45	79.22	67.96	11.26	73.59	...	81.58	...	...
September ...	143.40	71.60	82.03	70.30	11.73	76.16	.46	77.30	...	...
October ...	146.54	72.32	84.83	71.77	13.06	78.30	.70	72.06	...	...
November ...	145.40	73.40	87.50	72.26	15.24	79.88	...	69.53	...	...
December ...	140.48	72.61	87.48	72.22	15.26	79.85	.50	73.29	...	...
Totals ...	1,710.21	846.67	1,017.67	845.11	172.56	931.41	36.67	934.72	...	...
Means ...	142.51	70.55	84.80	70.42	14.38	77.61	3.05	77.89	...	...

ABURI.

METEOROLOGICAL RETURN FOR THE YEAR 1907.

MONTH.	TEMPERATURE.						Amount in Inches.	Degree of Humidity.	General Direction.	Average Force.	REMARKS.
	Solar Maximum.	Minimum on Grass.	Shade Maximum.	Shade Minimum.	Range.	Mean.					
January ...	137.90	73.41	80.87	72.77	8.10	76.82	...	88.41	...	...
February ...	140.46	71.89	89.03	71.57	17.46	80.30	.90	85.03	...	...
March ...	147.96	73.09	89.90	73.54	16.36	81.72	1.78	91.32	...	...
April ...	146.66	73.96	87.56	70.10	17.46	78.83	6.19	86.70	...	...
May ...	140.87	72.45	88.19	71.22	16.97	79.70	8.27	86.90	...	...
June ...	147.73	70.10	86.20	69.30	16.90	77.75	7.90	89.30	...	...
July ...	138.48	67.87	85.09	68.25	16.84	76.67	6.37	89.06	...	...
August ...	144.67	66.61	87.83	71.38	16.45	79.60	.44	88.83	...	...
September ...	147.43	69.16	86.13	73.73	12.40	79.93	5.90	89.43	...	...
October ...	148.32	69.54	87.64	72.61	15.03	80.12	7.41	88.61	...	...
November ...	149.03	68.83	89.46	69.90	19.56	79.68	4.50	89.93	...	...
December ...	144.22	66.67	87.45	68.54	18.91	77.99	1.07	89.22	...	...
Totals ...	1,733.73	843.58	1,045.35	852.91	192.44	949.11	50.73	1,062.74	...	...
Means ...	144.47	70.29	87.11	71.07	16.03	79.09	4.22	88.56	...	...

KETA.

METEOROLOGICAL RETURN FOR THE YEAR 1907.

MONTH.	TEMPERATURE.						RAINFALL.		WIND.		REMARKS.
	Solar Maximum.	Minimum on Grass.	Shade Maximum.	Shade Minimum.	Range.	Mean.	Amount in Inches.	Degree of Humidity.	General Direction.	Average Force.	
January ...	131.19	70.83	89.25	74.12	15.13	81.68	...	72.51	...	...
February ...	138.00	72.03	88.75	75.64	13.11	82.19	.88	73.39	...	...
March ...	140.70	73.90	89.90	79.06	10.84	84.48	1.55	73.61	...	...
April ...	141.53	70.73	89.53	75.50	14.03	82.51	4.99	76.30	...	...
May ...	141.09	71.51	89.03	75.45	13.58	82.24	3.46	77.32	...	...
June ...	140.00	71.66	86.50	74.10	12.40	80.30	11.48	85.36	...	...
July ...	138.06	71.96	85.06	73.70	11.36	79.38	2.08	86.45	...	...
August ...	134.96	67.90	83.87	71.77	12.10	77.82	.01	83.38	...	...
September ...	141.50	70.46	85.76	73.76	12.00	79.76	.47	81.36	...	...
October ...	143.67	71.67	86.35	74.83	11.52	80.59	.95	88.87	...	...
November ...	142.56	73.00	90.30	75.93	14.37	83.11	.59	77.90	...	...
December ...	138.51	73.03	89.90	75.58	14.32	82.74	...	77.70	...	...
Total ...	1,671.77	858.68	1,054.20	899.44	154.86	976.80	26.46	954.15	...	...
Means ...	139.31	71.55	87.85	74.95	12.90	81.40	2.20	79.51	...	...

CAPE COAST.

METEOROLOGICAL RETURN FOR THE YEAR 1907.

MONTH.	TEMPERATURE.						RAINFALL.		WIND.		REMARKS.
	Solar Maximum.	Minimum on Grass.	Shade Maximum.	Shade Minimum.	Range.	Mean.	Amount in Inches.	Degree of Humidity.	General Direction.	Average Force.	
January ...	132.03	73.83	85.48	75.51	9.97	80.49	.52	82.90	...	...
February ...	135.96	72.50	86.46	74.42	12.04	80.44	.19	81.50	...	...
March ...	140.87	72.19	87.03	74.16	12.87	80.59	1.93	79.00	...	...
April ...	137.46	73.10	84.93	74.40	10.53	79.66	1.63	83.20	...	...
May ...	138.64	71.93	86.45	74.61	11.84	80.53	10.26	84.87	...	...
June ...	139.50	71.00	85.26	73.70	11.56	79.48	14.42	88.73	...	...
July ...	139.93	71.35	85.83	71.67	14.16	78.75	3.96	91.25	...	...
August ...	142.22	71.54	86.80	72.12	14.68	79.46	...	85.67	...	...
September ...	143.40	71.50	87.03	71.63	15.40	79.33	1.32	92.20	...	...
October ...	142.87	70.64	87.64	71.41	16.23	79.52	3.20	92.70	...	...
November ...	146.13	70.83	88.06	73.66	14.50	80.81	...	93.00	...	...
December ...	145.67	71.41	87.74	73.22	14.52	80.48	.58	91.35	...	...
Total ...	1,684.65	861.82	1,038.71	880.41	158.30	959.54	38.01	1,046.37	...	...
Means ...	140.38	71.81	86.54	73.36	13.19	79.96	3.16	87.19	...	...

SEKONDI.

METEOROLOGICAL RETURN FOR THE YEAR 1907.

MONTH.	TEMPERATURE.						RAINFALL.	WIND.	REMARKS.
	Solar Maximum.	Minimum on Grass.	Shade Maximum.	Shade Minimum.	Range.	Mean.			
January ...	131.70	74.16	87.19	73.06	14.13	80.12	.87	79.93	...
February ...	140.00	73.67	87.92	72.39	15.53	80.15	.80	57.78	...
March ...	142.41	75.06	90.54	73.64	16.90	82.09	.33	54.48	...
April ...	140.16	73.80	88.43	72.60	15.83	80.51	4.75	56.30	...
May ...	142.12	74.41	88.00	73.54	14.46	80.77	7.24	57.25	...
June ...	130.46	72.60	83.36	72.23	11.13	77.79	17.78	62.13	...
July ...	135.54	70.54	82.61	70.41	12.20	76.51	7.88	60.64	...
August ...	137.48	69.29	82.38	67.83	14.55	75.10	.05	55.87	...
September ...	139.90	71.60	82.63	70.03	12.60	76.33	2.91	59.83	...
October ...	144.06	71.70	84.77	70.67	14.10	72.72	2.57	58.54	...
November ...	142.60	72.83	87.86	71.83	16.03	79.84	.05	53.76	...
December ...	136.03	73.58	88.00	72.29	15.71	80.14	.66	55.83	...
Totals ...	1,662.46	873.24	1,033.69	860.52	173.17	942.07	45.89	712.34	...
Means ...	138.53	72.77	86.14	71.71	14.43	78.50	3.82	59.36	...

AXIM.

METEOROLOGICAL RETURN FOR THE YEAR 1907.

MONTH.	TEMPERATURE.						RAINFALL.	WIND.	REMARKS.
	Solar Maximum.	Minimum on Grass.	Shade Maximum.	Shade Minimum.	Range.	Mean.			
January ...	132.93	56.29	87.29	69.35	17.94	78.32	1.67	88.19	...
February ...	135.50	56.60	86.39	69.50	16.89	77.94	.63	90.35	...
March ...	141.06	57.67	89.03	68.48	20.55	78.75	2.08	89.83	...
April ...	137.00	59.56	86.83	69.00	17.83	77.91	10.98	89.13	...
May ...	137.64	60.51	87.22	69.61	17.61	78.41	11.07	89.80	...
June ...	126.16	59.18	82.43	69.40	13.03	75.91	30.95	87.70	...
July ...	130.03	57.41	82.00	67.48	14.52	74.74	23.13	87.64	...
August ...	136.35	56.19	83.00	67.16	15.84	75.08	...	91.83	...
September ...	134.73	55.76	82.26	67.86	14.40	75.06	2.37	93.40	...
October ...	140.16	56.19	83.19	67.80	15.39	75.49	5.15	96.25	...
November ...	139.80	55.56	85.76	67.86	17.90	76.81	5.05	91.46	...
December ...	138.41	54.58	86.03	67.48	18.55	76.75	1.76	91.09	...
Totals ...	1,629.77	685.50	1,021.43	820.98	200.45	921.17	94.84	1,086.67	...
Means ...	135.81	57.12	85.11	68.41	16.70	76.76	7.90	90.55	...

KUMASI.

METEOROLOGICAL RETURN FOR THE YEAR 1907.

MONTH.	TEMPERATURE.						RAINFALL.		WIND.		REMARKS.
	Solar Maximum.	Minimum on Grass.	Shade Maximum.	Shade Minimum.	Range.	Mean.	Amount in Inches.	Degree of Humidity.	General Direction.	Average Force.	
January ...	136·80	64·51	86·83	69·19	17·64	78·01	.03	85·13	...	...
February ...	145·60	69·28	89·96	71·50	18·46	80·73	1·30	82·28	...	...
March ...	143·51	68·45	92·09	71·38	20·71	81·73	5·79	85·38	...	...
April ...	139·70	67·63	88·60	70·63	17·97	79·61	11·15	91·43	...	...
May ...	146·06	72·06	91·45	72·16	19·29	81·80	6·15	92·25	...	...
June ...	142·90	70·70	86·80	71·00	15·80	78·90	11·69	91·23	...	...
July ...	137·09	69·83	84·48	69·48	15·00	76·98	6·15	81·80	...	...
August ...	131·12	67·70	84·19	66·61	17·58	75·40	.20	93·22	...	...
September ...	142·00	69·93	85·36	69·36	16·00	77·36	11·45	93·50	...	...
October ...	144·35	68·80	86·83	70·12	16·71	78·47	5·55	91·96	...	...
November ...	145·30	70·80	87·51	68·93	18·58	78·22	3·51	85·30	...	...
December ...	132·25	69·87	86·87	69·67	17·20	78·27	.35	82·61	...	...
Totals ...	1,686·68	829·56	1050·97	840·03	210·94	945·48	63·32	1,056·09	...	...
Means ...	140·55	69·13	87·58	70·00	17·57	78·79	5·27	88·00	...	...

GAMBAGA.

METEOROLOGICAL RETURN FOR THE YEAR 1907.

MONTH.	TEMPERATURE.						RAINFALL.		WIND.		REMARKS.
	Solar Maximum.	Minimum on Grass.	Shade Maximum.	Shade Minimum.	Range.	Mean.	Amount in Inches.	Degree of Humidity.	General Direction.	Average Force.	
January ...	144·25	66·16	89·58	73·38	16·20	81·48	...	34·74	...	...
February ...	152·53	62·35	93·32	74·21	19·11	83·76	...	37·10	...	...
March ...	157·19	58·48	97·12	78·67	18·45	78·89	1·21	40·41	...	...
April ...	161·16	74·53	96·30	78·06	18·24	87·18	2·64	55·70	...	...
May ...	157·32	73·74	92·67	76·29	16·28	84·48	4·06	71·06	...	...
June ...	149·73	66·66	86·60	73·03	13·57	79·81	5·68	79·03	...	...
July ...	142·90	61·03	83·00	71·22	11·78	77·11	2·87	82·19	...	...
August ...	139·41	58·70	82·19	71·35	10·84	76·77	9·63	83·51	...	...
September ...	142·96	58·60	80·93	71·26	9·67	76·09	9·19	85·63	...	...
October ...	149·54	60·90	85·83	72·35	13·48	79·09	3·22	78·96	...	...
November ...	153·26	54·80	89·93	74·56	15·37	82·24	.67	61·73	...	...
December ...	145·61	45·32	88·25	73·32	14·93	80·78	...	39·48	...	...
Totals ...	1,795·86	741·27	1,065·72	887·70	177·92	967·68	39·17	749·54	...	...
Means ...	149·65	61·77	88·81	73·97	14·82	80·64	3·26	62·46	...	...

RETURN OF DISEASES AND DEATHS IN 1907—*continued.*

DISEASES.	GOLD COAST COLONY.				ASHANTI.				NORTHERN TERRITORIES.			
	Remaining in Hospital Admissions at end of 1906.	Hospital Admissions.	Extern.	Deaths.	Remaining in Hospital Admissions at end of 1907.	Hospital Admissions.	Extern.	Deaths.	Remaining in Hospital Admissions at end of 1907.	Hospital Admissions.	Extern.	Deaths.
Brought forward	... 16	462	4,350	32	13	4	315	1,339	7	3	—	86
(a) Larynx	—	—	—	—	—	—	—	—	—	—	—	—
(b) Trachea and Bronchitis	... 4	—	—	—	—	—	—	—	—	—	—	—
(c) Lung	... —	—	—	—	—	—	—	—	—	—	—	—
(d) Pleura	... —	—	—	—	—	—	—	—	—	—	—	—
Diseases of the Respiratory System—												
(a) Larynx	—	—	—	—	—	—	—	—	—	—	—	—
(b) Trachea and Bronchitis	... 25	1,507	40	—	—	—	—	—	—	—	—	—
(c) Lung	... 77	307	3	—	—	—	—	—	—	—	—	—
(d) Pleura	... 13	74	19	1	—	—	—	—	—	—	—	—
Diseases of the Digestive System—												
(a) Mouth	—	—	—	—	—	—	—	—	—	—	—	—
(b) Jaws and Antrum	... —	—	—	—	—	—	—	—	—	—	—	—
(c) Teeth, Alveoli and Gums	... —	—	—	—	—	—	—	—	—	—	—	—
(d) Tongue	... —	—	—	—	—	—	—	—	—	—	—	—
(e) Palate and Fauces	... —	—	—	—	—	—	—	—	—	—	—	—
(f) Pharynx	... —	—	—	—	—	—	—	—	—	—	—	—
(g) Stomach	... —	—	—	—	—	—	—	—	—	—	—	—
(h) Intestine	... —	—	—	—	—	—	—	—	—	—	—	—
(i) Rectum and Anus	... —	—	—	—	—	—	—	—	—	—	—	—
(j) Liver	... —	—	—	—	—	—	—	—	—	—	—	—
(k) Peritoneum	... —	—	—	—	—	—	—	—	—	—	—	—
(l) Salivary Glands	... —	—	—	—	—	—	—	—	—	—	—	—
Diseases of the Lymphatic System—												
(a) Spleen	... —	—	—	—	—	—	—	—	—	—	—	—
(b) Lymphatics	... —	—	—	—	—	—	—	—	—	—	—	—
(c) Supra-Renal Capsules	... —	—	—	—	—	—	—	—	—	—	—	—
Diseases of the Urinary System—												
(a) Kidneys and Ducts	... —	—	—	—	—	—	—	—	—	—	—	—
(b) Urinary Disorders	... —	—	—	—	—	—	—	—	—	—	—	—
(c) Bladder	... —	—	—	—	—	—	—	—	—	—	—	—

LOCAL DISEASES.

